

## **Exhibit A**

## **CURRICULUM VITAE OF DAVID O. KAZMER, P.E., PH.D.**

### **Contact Information:**

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### **Principal Areas of Technology Leadership:**

- Machine and Control Systems Design
- Injection Mold Design Engineering
- Polymer Processing
- Product Design for Manufacturing and Assembly
- Plastics Product Design
- Robust Optimal Design

### **Functional Areas of Expertise:**

- Plastic product design and plastics manufacturing process development, especially related to injection molding, extrusion, blow molding, and thermoforming.
- Mechanical design including concept design, concept selection, materials selection, layout design, stress analysis, heat transfer, detailed design, assembly synthesis, fits and tolerances, performance testing, failure analysis;
- Design for manufacturing and assembly including needs analysis, specification, process selection, cost and value analysis, robust design, quality function deployment, design of experiments, response surface analysis, failure modes and effects analysis, and design for X (machining, molding, assembly, etc.);
- Simulation including constitutive modeling of materials, phenomenological modeling, development and solution of differential equations using finite difference and finite element methods, meshing, programming (C, C++, Pascal, BASIC, Fortran, Java, and other languages), numerical stability analysis, sensitivity analysis, stochastic and Monte Carlo methods, and interfacing;
- Manufacturing process development including system decomposition, axiomatic systems design, subsystems analysis, process instrumentation, signal conditioning,

data acquisition, systems integration, hierarchical control systems design, development and tuning of control laws, validation, commissioning, deployment, and training;

- Operations management including manufacturing strategy, forecasting, aggregate planning, inventory control, supply chain management, production control systems, operations scheduling, project scheduling, facilities design, quality and assurance, reliability and maintenance;
- Software development including ANSI C, C++, Visual C#, Visual Basic, application automation, MySQL databases, Java, Javascript, PHP, Pascal, Fortran, LabView, LabWindows, and others.

#### **Education:**

- Ph.D., 1995, Stanford University, Mechanical Engineering Design Division. Dissertation: Dynamic Feed Control for Injection Molding. Committee: P. Barkan (Chair, deceased), W. Hausman, K. Ishii, F. Prinz.
- 1991 M. Sci., Rensselaer Polytechnic Institute, Department of Mechanical Engineering, Thesis: Development and Validation of a Radial Flow Analysis Tool. Advisor: D. Lee.
- 1989 B. Sci., Cornell University, Sibley School of Mechanical Engineering, with Distinction.

#### **Experience:**

- September, 2005 – present: Professor, Univ. Mass. Lowell, Department of Plastics Engineering
- January, 2002 – August, 2005: Associate Professor, Univ. Mass. Lowell, Department of Plastics Engineering
- 2001, Director of Research & Development, Synventive Molding Solutions (Peabody, Massachusetts)  
Responsible for invention, implementation, and support of advanced melt delivery systems for the plastics industry, including: 1) Dynamic Feed Control for multi-gate closed loop pressure control, 2) hot runner molding of molten magnesium, and 3) an all-electric melt delivery system. Responsibilities included engineering design and management, budgeting responsibilities, market development, and field support.
- June, 2000 – June, 2001: Associate Professor, Univ. Mass. Amherst, Department of Mechanical and Industrial Engineering

- September, 1995 – May, 2000: Assistant Professor, Univ. Mass. Amherst, Department of Mechanical and Industrial Engineering
- 1992-1994 (part time), Technology Programs Manager, GE Plastics Commercial Development Center (Pleasanton, California)  
Developed design methodologies and manufacturing technologies to position GE Plastics as a value added supplier. Translated relevant technology to regional development centers for commercial application. Provided design and processing support on critical applications.
- 1991, Design and Process Development Engineer, GE Plastics Advanced Design Engineering Group (Pittsfield, Massachusetts)  
Developed design methodologies and manufacturing technologies to position GE Plastics as a value added supplier. Translated relevant technology to regional development centers for commercial application.
- 1990, Mechanical Engineer, GE Corporate Research & Development Mechanics of Materials Laboratory (Schenectady, New York)  
Investigated industrial plastic conversion processes. Developed process simulations which became part of GE Plastics' design methodology. Examined material characterization techniques to estimate molded product consistency.
- 1988-1989, Applications Engineer Intern, GE Plastics Advanced Design Engineering Group (Pittsfield, Massachusetts)  
Performed process simulations to ensure product manufacturability as well as structural analyses to predict and optimize part performance.

**Professional Memberships:**

- Member, American Society of Mechanical Engineers (ASME)
- Member, Society of Plastics Engineers (SPE)
- Member, Polymer Processing Society
- Member, Institute of Electrical and Electronics Engineers
- Member, American Society for Engineering Education
- Registered Professional Manufacturing Engineer, State of California, License # MF004751

**Honors and Awards:**

- 2004, Best Paper Award, 10th ASME Design for Manufacturing Conference
- 2000, University of Massachusetts Amherst, College of Engineering Outstanding Young Faculty Award
- 1999, Lilly University Teaching Fellowship
- 1998, Office of Naval Research Young Investigator Award
- 1998, Best Paper Award, Society of Plastics Engineers' Design Division
- 1997, National Science Foundation Career Award
- 1996, 1997, and 2000, College of Engineering Outstanding Advisor Service Award
- 1995, Future Professor of Manufacturing, Stanford Integrated Manufacturing Association
- 1994, Innovative Industrial Process Award, U.S. Department of Energy
- 1993, Best of Program, Lincoln Electric National Design Competition
- 1992, Management award for outstanding achievements, General Electric Company
- 1989, Management award for outstanding contributions, General Electric Company

**Sponsored Research:**

- MKS, SenseLink Project, \$50,000 plus \$40,000 in kind, 2006.
- National Science Foundation, High Rate Nano-Manufacturing (with J. Mead and C. Barry of UML), Status: funded 2004-.
- National Science Foundation, Sensors: Self-Powered Spatial Sensing Array for Injection Molding Process Monitoring (with R. Gao of UMass Amherst), UML Budget: \$218,364, Status: funded 2004-07.
- Mold-Masters Ltd., Technical Feasibility of a Self-Regulating Melt Valve, UML Budget: \$40,000 plus \$20,000 in kind, Status: funded 2004.
- National Science Foundation, Synthesis of Melt Pumps & Brakes for Polymer Processing, UML Budget: \$213,508, Status: funded 2003-06.
- National Science Foundation, Input Profiling for Plastic Molding and Forming Processes (with K. Danai of UMass Amherst), UML Budget: \$78,500, Status: not funded 2004.

- Mold Masters Ltd., Technical Feasibility of Decoupled Gating, UML Budget: \$40,000 plus \$120,000 in kind, Status: funded 2003.
- National Science Foundation, Model-Based Set-Point Profiling for Plastics Molding, (with K. Danaï of UMass Amherst), UML Budget: \$73,000, Status: not funded 2003.
- National Science Foundation, Plastics Partnerships for Innovation, (with S. McCarthy), UML Budget: \$600,000, Status: not funded 2002.
- National Science Foundation, Information System Proposal: Solution of Robust & Confident Process Windows, UML Budget: \$337,561, Status: not funded 2002.
- Thermo-CeramiX LLC, Technical Feasibility of Isothermal Molding, UML Budget: \$15,000 plus \$20,000 in kind, Status: funded 2002.
- National Science Foundation, Remote Sensors for Injection Molding (with R. Gao), Budget: \$310,000, Status: funded 1999-2002.
- GE Plastics, Design for Six Sigma: Phase III, (with T. Blake), Budget: \$35,000, Status: funded 1999.
- Office of Naval Research, Dynamic Cooling for Injection Molding, Budget: \$298,000, Status: funded 1998-2001.
- GE Plastics, Optical Molding Process Development (w. K. Danaï), Budget: \$42,000, Status: funded 1998.
- National Science Foundation, Remote Sensors for Injection Molding (with R. Gao), Budget: \$275,000, Status: not funded 1998.
- AlliedSignal Plastics, Advanced Design Methods for Injection Molded Parts: Phase I (with B. Kim) Budget: \$35,000, Status: not funded 1998.
- GM Delphi, Virtual Search Method for Automotive Applications (with K. Danaï), Budget: \$40,000, Status: not funded 1999.
- GE Plastics, Tight Tolerance Thermoforming Extension, Budget: \$25,000 with \$10,000 in-kind, Status: funded 1999.
- GE Plastics, Design for Six Sigma: Phase II (with T. Blake), Budget: \$35,000, Status: funded 1998.
- Industry Consortium (AMP, Ford, Gillette), Quality Control Methods for Injection Molding (with K. Danaï), Budget: \$180,000, Status: not funded 1998.
- National Science Foundation Graduate Engineering Reform, Professional Engineering Education (with J. Rinderle, D. Fisher, and C. Poli), Budget: \$800,000, Status: not funded 1996.
- GE Plastics, Tight Tolerance Thermoforming, Budget: \$35,000 with \$10,000 in-kind, Status: funded 1997.
- Sloan Foundation, Integrated Manufacturing Paradigms, Budget: \$35,000, Status: funded 1997.

- Industry Consortium (AlliedSignal, BIC, Polaroid, Pitney Bowes), Molded Product Design, (with J. Rinderle), Budget: \$500,000, Status: not funded.
- National Science Foundation, Modeling Paradigm for Acquisition, Representation, and Explanation of Expertise (with K. Danai, M. Tsapatsis, and P. Utgoff), Budget: \$340,000, Status: not funded 1997.
- Packard Foundation, Intelligent Processing of Polymeric Materials, Budget: \$500,000, Status: not funded 1997.
- GE Plastics, Design for Six Sigma: Phase I, Budget: \$35,000, Status: funded 1996.
- National Institute of Standard and Technology, Injection Molding Quality (with G. Trantina and A. Poslinski), Budget: \$4,000,000 (\$250,000 Amherst), Status: not funded 1996.
- National Science Foundation, Process Tuning and Optimization (with K. Danai), Budget: \$198,000, Status: funded 1996-1999.
- National Science Foundation, CAREER: Synthesis of Engineering Analysis Methods into the Design Process, Budget: \$310,000, Status: funded 1996-1999.
- GE Plastics, Electro Magnetic Shielding Review, Budget: \$35,000, Status: not funded 1996.
- CUMIRP (Poly. Sci. research initiation project), Electro Magnetic Shielding Review, Budget: \$12,000, Status: not funded 1995.
- Univ. Mass. Amherst (research initiation project), Cost of Complexity in Product Design and Manufacture, Budget: \$5,000, Status: funded 1995.
- National Science Foundation, Cost of Complexity, Budget: \$300,000, Status: not funded 1995.
- National Science Foundation, Virtual Search Method (with K. Danai), Budget: \$178,000, Status: not funded 1995.
- Industry Consortium (GE Plastics, Hewlett Packard, Dynisco Instruments), Moldability Program, Budget: \$25,000 with \$250,000 in kind, Status: funded 1994-95.
- U.S. Dept. of Energy, Innovative Industrial Processes, Budget: \$40,000, Status: funded 1994.

**Graduate Student Advising (principally advised students only):**

- Stephen Johnston, D. Eng., Plastics Engineering, 2007, "Intelligent sensing of the injection molding process."
- Daniel Hazen, M.S.E., Plastics Engineering, 2007, "Data feature definition and validation in quality control."
- Suganya Velusama, M.S.E., Plastics Engineering, 2007, "Ultrasonic monitoring in injection molding."



- Rakshit Amba, M.S.E., Plastics Engineering, 2007, "Control of surging in extrusion."
- Mark Doyle, M.S.E., Plastics Engineering, 2007, "Survey of commercial hot runner systems."
- Michael Johnes, M.S.E., Plastics Engineering, 2006, "Macro molding of micro parts."
- Peter Knepper, M.S.E., Plastics Engineering, 2006, "Multi-objective optimization of injection molding."
- Ruchi Karania, M.S.E., Plastics Engineering, 2005, "Analysis of lower volume plastics manufacturing processes."
- William Rousseau, M.S.E., Plastics Engineering, 2005, "Analysis and validation of color changes in hot runner molding."
- Kathryn Garnavish, M.S.E., Plastics Engineering, 2005, "Analysis of hesitation effects in oscillating polymer flows."
- Stephen Johnston, M.S.E., Plastics Engineering, 2005, "Real time simulation of decoupled molding."
- Ranjan Nageri, M.S.E., Plastics Engineering, 2005, "Real time simulation of the injection molding process."
- Greg Rathbone, M.S.E., Plastics Engineering, 2005, "Validation of thermal wave production of optical media."
- Vijay Kudchakar, M.S.E., Plastics Engineering, 2005, "Validation of a self-regulating melt pressure valve."
- Rahul Pulchhari, M.S.E., Plastics Engineering, 2005, "Characterization of a polymer lubricated hydrodynamic bearing."
- Charles Theurer, Ph.D., Mechanical Engineering (Amherst), 2004, "Extraction and digitization of a process signal for self-powering a wireless pressure sensor."
- Mahesh Munavalli, M.S.E., Plastics Engineering, 2004, "Design and analysis of a self-regulating melt pressure valve."
- Hitesh Mundhra, M.S.E., Plastics Engineering, 2004, "Development and validation of process windows."
- Dheeraj Gupta, M.S.E., Plastics Engineering, 2004, "Design and validation of low force melt valves in polymer processing."
- Akash Kamoolkar, M.S.E., Mechanical Engineering (Amherst), 2004, "Optimization of ejector systems for injection molded parts using genetic algorithms."
- Brendan Cahill, M.S.E., Plastics Engineering, 2003, co-chair with R. Malloy, "Design for in-mold labeling."
- Nirmal Doshi, M.S.E., Plastics Engineering, 2003, "Design of a platenless injection molding machine."
- Kaushik Manek, M.S.E., Plastics Engineering, 2003, "Analysis of yield prediction models in plastics manufacturing."



- Gautam Balasubrahmanyam, M.S.E., *Plastics Engineering*, 2003, "The stability of plastic melt flows at low temperatures and flow rates"
- Yash Dave, M.S.E., *Plastics Engineering*, 2003, "Concept validation of a melt brake for extrusion"
- Binfeng Fan, Ph.D., *Mechanical Engineering (Amherst)*, 2002, "Quality simulation and optimization of optical media produced via injection-compression molding."
- Deepak Kapoor, M.S.E., *Manufacturing Engineering*, 1997, "Multi-cavity melt control in injection molding."
- Tatiana Petrova, M.S.E., *Mechanical Engineering*, 1997, "Hybrid neural network models for prediction of molded part quality."
- Sally Carter, BS, *Mechanical Engineering*, 1998, "Structural design of bosses for molded plastic parts."
- Adekunle Fagade, Ph.D., *Industrial Engineering*, 1999, "The role of complexity in product life-cycle cost."
- David Hatch, M.S.E., *Mechanical Engineering*, 1999, "Modeling and optimization for processing of optical media."
- Haoyu Xu, M.S.E., *Mechanical Engineering*, 1999, "Cooling considerations for injection molding."
- Haihong Xu, M.S.E., *Mechanical Engineering*, 1999, "Shrinkage prediction of thermoformed parts."
- Christoph Roser, Ph.D., *Mechanical Engineering*, 2000, "A flexible design methodology."
- Prasanth Ambady, M.S.E., *Mechanical Engineering*, 2001, "Adaptive control of the injection mold cooling process."
- Ian Stuart, M.S.E., *Mechanical Engineering*, 2001, "Production quality improvements in plastics processing."
- Liang Zhu, Ph.D., *Mechanical Engineering*, 2001, "An Extensive Simplex Method for global feasibility evaluation in systems design."
- Charles Theurer, M.S.E., *Mechanical Engineering*, 2001, "Conceptual design of a remotely energized pressure sensor."

#### **Books and Book Chapters:**

- Kazmer, D.O., "Precision Process Control," Precision Injection Molding, Hanser Publishers, R.W. Friedl, J. Greener, Ed., 2006.
- Kazmer, D.O., "Injection Molding," Encyclopedia of Chemical Processing, Marcel Dekker, Sunggyu (K.B.) Lee, Ed., 2005.

- Kazmer, D.O., "Computer Flow Simulations," Society of Plastics Engineers' Molding Toolbox, 2002.
- Roser, C. and D. O. Kazmer, "Defect Cost Analysis," Plastics Failure Analysis and Prevention, J. Moalli Ed. , 2001.
- Kazmer, D.O. and K. Danai, "Control of Polymer Processing," in The Control Handbook, edited by W. S. Levine, published by CRC & IEEE Press, 2001.
- Kazmer, D. O., "Dynamic Feed Control for Injection Molding," Ph.D. Dissertation, Mechanical Engineering Design Division, Stanford University, 1995.
- Kazmer, D. O., "Development and Validation of a Radial Flow Analysis Tool", M.S.E. Thesis, Department of Mechanical Engineering, Rensselaer Polytechnic Institute, 1991.

#### **Reviewed Articles:**

- R. Karania and D. Kazmer, "Low Volume Plastics Manufacturing Strategies," Submitted to ASME Journal of Mechanical Design.
- L. Zhang, C. Theurer, R. X. Gao, and D. O. Kazmer, "Design Of Ultrasonic Transmitters With Defined Frequency Characteristics For Wireless Pressure Sensing In Injection Molding," Submitted to the Journal of Acoustics.
- D. Kazmer and L. Zhu, "A Quality Modeling System," Submitted to the Journal of Quality Technology.
- Y. Cui, R. X. Gao, and D. O. Kazmer, "A Bond Graph Approach to Energy Efficiency Analysis of a Self-Powered Wireless Pressure Sensor," Submitted to Journal of Smart Structures and Systems.
- Kazmer, D., and B. Fan, "Polymer Flow in a Melt Pressure Regulator," Submitted to the ASME Journal of Manufacturing Science.
- S. Dong, C. E. B. Fan, K. Danai, and D. O. Kazmer, "Process-Driven Input Profiling for Plastics Processing," Submitted to the ASME Journal of Manufacturing Science.
- L. Zhang, C. Theurer, R. X. Gao, and D. O. Kazmer, "Ultrasonic Pulses Detection and Differentiation using Analytic Wavelet for Injection Mold Cavity Pressure Measurement," Submitted to the ASME Journal of Manufacturing Science.
- D. O. Kazmer and D. Gupta, "A Low Force Valve for Dynamic Control of Molten Plastics," International Polymer Processing, v. 21, n. 2, pp. 175-182.

- S. Johnston and D. Kazmer, "Decoupled Gating and Simulation for Injection Molding," *Polymer Plastics Technology & Engineering*, v. 45, pp. 575-584, 2006.
- D. O. Kazmer, R. Nageri, V. Kudchakar, B. Fan., R. X. Gao, "Validation of Three On-Line Flow Simulations for Injection Molding," *Polymer Engineering and Science*, v. 46, n. 3, pp. 274-288, 2006.
- D. Kazmer , D. Gupta, M. Munavalli, V. Kudchakar, and R. Nageri, "Design and Performance Analysis of a Self-Regulating Melt Pressure Valve," *Polymer Engineering and Science*, v. 46, n. 4, p. 549-557, 2006.
- B. Fan, D. Kazmer, and R. Nageri, "An Analytical Non-Newtonian and Non-Isothermal Viscous Flow Simulation," v. 45, p. 429-438, 2006.
- C.B. Theurer, L. Zhang, D.O. Kazmer, R.X. Gao, and R. W. Jackson, "Passive Charge Modulation for a Wireless Pressure Sensor" *IEEE Sensors Journal*, v. 6, n. 1, p. 47-54, 2006.
- D. O. Kazmer and D. Gupta, "A Low Force Shut-off Valve for Dynamic Control of Molten Plastics in a Mold," *International Polymer Processing*, n. 4, p. 348-356, 2005.
- Kazmer, D.; Kudchadkar, V.; Nageri, R. , "Validation of moulding consistency with a self-regulating melt pressure valve," *Plastics, Rubber, and Composites Processing*, v. 33, n. 9-10, p. 438-445, 2005.
- Kazmer, D.; Kudchadkar, V.; Nageri, R. , "Validation of moulding productivity with two self-regulating melt pressure valves," *Plastics, Rubber, and Composites Processing*, v. 33, n. 9-10, p. 446-451, 2005.
- B. Fan, D. Kazmer, "Low-temperature modeling of the time-temperature shift factor for polycarbonate," *Advances in Polymer Technology*, v. 24, n. 4, p. 278-287, 2005.
- Kazmer, D., Lotti, C., Breta, R. E. S., Zhu, L., "Tuning and Control of Dimensional Consistency in Molded Products," *Advances in Polymer Technology*, v. 23, n. 3, p. 163-175, 2004.
- C.B. Theurer, L. Zhang, D.O. Kazmer, and R.X. Gao, "Energy Extraction for a Self-Energized Pressure Sensor" *IEEE Sensors Journal*, v. 4, n. 1, p. 28-35, 2004.
- B. Fan, D. O. Kazmer, W.C. Bushko, R. P. Thierault, A. J. Poslinski, "Birefringence Prediction of Optical Media," *Polymer Engineering & Science*, v. 44, n. 4, April, 2004, p. 814-824.

- Zhang, L., Theurer, C., Gao, R., and D. O. Kazmer, "A Self-Energized Sensor for Wireless Injection Mold Cavity Pressure Measurement: Design and Evaluation," ASME Journal of Dynamic Systems (DSC), v. 72, n. 2, 2003, p. 1167-1173.
- L. Zhang, C. Theurer, R. Gao, and D. Kazmer, "Frequency Design of an Ultrasonic Transmitter for Injection Molding Pressure Measurement", Transactions of the North American Manufacturing Research Institution of SME, Vol. XXXI, p., 579-586, 2003.
- B. Fan and D. O. Kazmer, "Warpage Prediction of Optical Media," Journal of Polymer Science: Part B Polymer Physics, v. 41, p. 859-872, 2003.
- L. Zhu and D. O. Kazmer, "An Extended Simplex Method for Global Feasibility Evaluation," Journal of Engineering Optimization, v. 35, n. 2, p. 165-176, 2003.
- B. Fan and D. O. Kazmer, "Simulation of Injection-Compression Molding of Optical Media," Polymer Engineering & Science, v. 43, n. 3, p. 596-606, 2003.
- L. Zhang, C. B. Theurer, R. X. Gao, and D. O. Kazmer, "Development of A Wireless Pressure Sensor With Remote Acoustic Transmission," Journal of the North American Manufacturing Research Institute, Vol. XXX, p. 573-580, 2002.
- D. Kazmer, D. Kapoor, C. Roser, L. Zhu, and D. Hatch, "Definition and Application of A Process Flexibility Index," ASME Journal of Manufacturing Science, v. 125, p. 164-172, 2003.
- C. Roser, D. Kazmer, and J. Rinderle, "An Economic Design Change Method," ASME Journal of Mechanical Design, v. 125, n. 2, p. 233-239, 2003.
- Zhu, L. and D. Kazmer, "A Performance-Based Representation for Engineering Design," ASME Journal of Mechanical Design, v. 123, n. 4, p. 486-493, 2001.
- Yang, D., K. Danai, and D. Kazmer, "A Knowledge-Based Tuning Method for Injection Molding Machines," ASME J. Manufacturing Science and Engineering, 2001. 123(4): p. 682-691.
- Kazmer, D., L. Zhu, and D. Hatch, "Process Window Derivation With an Application to Optical Media Manufacturing," ASME Journal of Manufacturing Science, v. 123, p. 303-314, 2001.
- H. Xu and D. Kazmer, "Thermoforming Shrinkage Prediction," Journal of Polymer Engineering and Science, v. 41, n. 9, 2001.
- D. Hatch and D. Kazmer "Process Transfer Function Development For Optical Media Manufacturing," International Journal of Advanced Manufacturing Technology, v. 18, n. 4, 2001.

- H. Xu and D. Kazmer, "Tight Tolerance Thermoforming," *International Polymer Processing*, v. 16, n. 2, p. 208-215, 2001.
- J. Reilly, M. Doyle, and D. O. Kazmer, "An Assessment of Dynamic Feed Control in Modular Tooling," *Journal of Injection Molding Technology*, September, 2001, 5 (1), p. 52-61.
- D. Kazmer and D. Hatch, "Towards Controllability of Injection Molding," *Journal of Materials Processing and Manufacturing Science*, October, 2000, 9 (2), p. 94-99.
- A. Fagade and D. O. Kazmer, "Early Cost Estimation for Injection Molded Parts," *Journal of Injection Molding Technology*, September, 2000, 4 (3), p. 97-106.
- H. Xu, J. Wysocki, D. Kazmer, P. Bristow, B. Landa, J. Riello, C. Messina, and R. Marrey, "Shrinkage Estimation for Thermoformed Parts," *Thermoforming Quarterly*, March, 2000, p. 8-14.
- Xu, H. and D. O. Kazmer, "Productivity Evaluation with a Stiffness-Based Ejection Criterion of Injection Molding," *Journal of Injection Molding Technology*, 1999, 3 (4), p. 211-218.
- Kazmer, D.O. and C. Roser, "Evaluation of Product and Process Design Robustness," *Research in Engineering Design*, 1999. 11 (1), p. 21-30.
- Xu, H. and D. O. Kazmer, "A Stiffness-Based Criterion for Ejection of Injection Molded Parts," *International Journal of Polymer Processing*, 1999. 14 (1), p. 52-60.
- Petrova, T. and D.O. Kazmer, "Incorporation of Phenomenological Models in a Hybrid Network for Quality Control of Injection Molding," *Polymer-Plastics Technology and Engineering*, 1999. 38 (1), p. 1-18.
- Petrova, T. and D.O. Kazmer, "Hybrid Neural Networks for Pressure Control of Injection Molding," *Advances in Polymer Technology*, 1999. 18 (1), p. 19-31.
- Kapoor, D. and D. O. Kazmer, "Consistency and Flexibility of Multi Cavity Melt Control Injection Molding in a Commercial Application," *International Journal of Polymer Processing*, 1998. 13 (4), p. 398-405.
- Kazmer, D.O. and D.S. Roe, "Exploiting Melt Compressibility to Achieve Improves Weld Line Strengths," *International Journal of Plastics, Rubber and Composites Processing*, 1998. 27 (6), p. 272-278.
- Ivester, R., Danai, K. and D. O. Kazmer, "Virtual Search Method for Injection Molding," *Journal of Injection Molding Technology*, 1998, 2 (3), p. 165-172.

- Kazmer, D.O. and P. Barkan, "Multi-Cavity Pressure Control in the Filling and Packing Stages of the Injection Molding Process," *Polymer Engineering and Science*, 1997. 37(11): p. 1865-1879.
- Kazmer, D.O. and P. Barkan, "The Process Capability of Multi-Cavity Pressure Control of the Injection Molding Process," *Polymer Engineering and Science*, 1997. 37(11): p. 1880-1897.
- Kazmer, D.O. and R.G. Speight, "Polymer Injection Molding Technology for the Next Millenium," *Journal of Injection Molding Technology*, 1997. 1(2): p. 81-90.
- Kazmer, D.O., "Best Practices for Injection Molding," *Journal of Injection Molding Technology*, 1997. 1(1): p. 10-17.
- Kazmer, D.O., J. Rowland, and G. Sherbelis, "The Foundations of Intelligent Process Control," *Journal of Injection Molding Technology*, 1997. 1(1): p. 44-56.
- Taylor, C.A., H.G. DeLorenzi, and D.O. Kazmer, "Experimental and Numerical Investigations of the Thermoforming Process," *Polymer Engineering and Science*, 1992. 32(16): p. 1163-1173.

#### **Conference Papers:**

- D. Kazmer, J. Duffy, B. Perna, "Learning through Service: Analysis of a First, College Wide Service Learning Course," *Annual Conference of the American Society of Engineering Education*, Chicago, IL, June 18-21, 2006.
- S. Johnston, D. Kazmer, R. Gao, "Estimation of Melt Temperature from In-Mold Temperature Sensor Data," *Proceedings of the Society of Plastics Engineers Annual Technical Conference*, 2006.
- P. Knepper, D. Kazmer, "Multi-Objective Velocity Profile Optimization," *Proceedings of the Society of Plastics Engineers Annual Technical Conference*, 2006.
- B. S. Ghumman, Z. Tao, Rakshit Amba, C.M.F. Barry, and D. Kazmer, "Pressure Regulation of The Extrusion Process," *Proceedings of the Society of Plastics Engineers Annual Technical Conference*, 2006.
- R. Karania and D. Kazmer, "Low Volume Plastics Manufacturing Strategies," *Design for Manufacturing Symposium at the ASME International Mechanical Engineering Congress and Exposition*, 2005.
- D. Kazmer, "Domain-Centric Design Education," *ASME IDETC 10th Design for Manufacturing Conference*, 2005.



- David O. Kazmer, Ranjan Nageri, Bingfeng Fan, Vijay Kudchadkar, Stephen Johnston, "Validation of On-Line Molding Process Simulation," Proceedings of the 2005 Society of Plastics Engineers Annual Technical Conference, 2005.
- David O. Kazmer, "Wall Thickness Optimization In Molded Product Design," Proceedings of the 2005 Society of Plastics Engineers Annual Technical Conference, 2005.
- David O. Kazmer, Kathryn Garnavish, & Ranjan Nageri, "An Investigation into Hesitation Effects in Oscillating Flows," Proceedings of the 2005 Society of Plastics Engineers Annual Technical Conference, 2005.
- David O. Kazmer and Mahesh Munavallia, "Design and Performance Analysis Of A Self-Regulating Melt Pressure Valve," Proceedings of the 2005 Society of Plastics Engineers Annual Technical Conference, 2005.
- David O. Kazmer, Vijay Kudchadkar, and Ranjan Nageri, "Performance of a Self-Regulating Melt Pressure Valve," Proceedings of the 2005 Society of Plastics Engineers Annual Technical Conference, 2005.
- David O. Kazmer and Hitesh Mundhra, "Derivation of Process Windows," Proceedings of the 2005 Society of Plastics Engineers Annual Technical Conference, 2005.
- David O. Kazmer, Peter Knepper, and Stephen Johnston, "A Review of In-Mold Pressure and Temperature Instrumentation," Proceedings of the 2005 Society of Plastics Engineers Annual Technical Conference, 2005.
- David O. Kazmer, Robert Gao, Yong Cui, Stephen Johnston, and Peter Knepper, "Concept Design of a Wireless Pressure, Temperature, and Flow Rate Sensor for Injection Molding," Proceedings of the 2005 Society of Plastics Engineers Annual Technical Conference, 2005.
- D. Kazmer, L. Zhu, "Self-Regulating Melt Brakes for Dynamic Control of Molten Plastics," National Science Foundation Design & Manufacturing Conference, Scottsdale, AZ, 2005.
- D. Kazmer and L. Zhu, "An Integrated Performance Modeling System," Design for Manufacturing Symposium at the 2004 International Mechanical Engineering Congress, Anaheim, CA, 2004.
- D. Kazmer, B. Fan, R. Mukhari, "Real Time Flow Rate Estimation in Injection Molding," Molding Technology Symposium at the 20th Annual Meeting of the Polymer Processing Society, Akron, OH, June 21, 2003.



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- D. Kazmer, and B. Fan, "Simulation of Polymer Flow in a Dynamic Pressure Regulator," 8th International Conference on Numerical Methods in Manufacturing Processes, American Institute of Physics, June, 2004.
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**Invited Presentations:**

- D. Kazmer, "A Data Driven Approach to Attaining 100% Automatic Quality Assurance," Society of Plastics Engineers E-Live Seminar, April 6, 2006.
- D. Kazmer, "Advanced Methods for Plastic Product Design and Process Control," Toyota Motor and Suppliers Meeting, Lowell, MA, April 22, 2005.
- D. Kazmer, "What's the big deal about something very small? The Business of Nano", Rotary Club Meeting, Dracut, MA, May 17, 2005.
- D. Kazmer, "Self-Regulating Melt Valves for Polymer Processing," SPE Merrimack Valley Meeting, National Plastics Center, May 12<sup>th</sup>, 2005.
- D. Kazmer, "Self-Regulating Melt Valves for Polymer Processing," Synventive Molding Solutions Meeting, Lowell, MA, May 10<sup>th</sup>, 2005.
- D. Kazmer, "Simulation of Polymer Processing," National Science Foundation Center for High Rate Nano-Manufacturing, Lowell, MA, March 26<sup>th</sup>, 2005.

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- D. Kazmer, Invention Disclosure, Looking Glass: An Optimization System for Injection Molding, 1998.
- D. Kazmer, Invention Disclosure, Twin Screw Extruder for Continuous Manufacture of Concrete, 1997.
- D. Kazmer, Invention Disclosure, Laser Grid Array Stereolithography, 1997.

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#### **Courses Taught:**

- Fall 1995, ME415: Mechanical Systems Design, Enrollment: 14.
- Spring 1996, ME415: Mechanical Systems Design, Enrollment: 20.
- Fall 1996, MIE477: Production Scheduling and Control, Enrollment: 15.
- Spring 1997, MIE415: Mechanical Systems Design, Enrollment: 32.
- Fall 1997, MIE760: Advanced Mechanical Systems Design, Enrollment: 15.
- Spring 1998, MIE415: Mechanical Systems Design, Enrollment: 28.
- Spring 1998, MIE395: Engineering Professionalism Seminar, Enrollment: 20.
- Fall 1998, MIE697M: Modern CAD System Development, Enrollment: 16.
- Spring 1999, MIE415: MIE Capstone Systems Design, Enrollment: 25.
- Spring 1999, MIE395: Engineering Professionalism Seminar, Enrollment: 40.
- Fall 1999, MIE113: Introduction to Mech. & Ind. Eng, Enrollment: 24.
- Fall 1999, MIE697P: Manufacturing Process Design, Enrollment: 15.
- Spring 2000, MIE395: Engineering Professionalism Seminar, Enrollment: 45.

- Spring 2000, MIE415: Mechanical Systems Design, Enrollment: 20.
- Fall 2000, MIE113: Introduction to Mech. & Ind. Eng, Enrollment: 21.
- Fall, 2000, MIE760: Advanced Mechanical Systems Design, Enrollment: 8.
- Spring 2000, MIE415: Mechanical Systems Design, Enrollment: 9.
- Spring 2002, 26.373: Mold Engineering I, Enrollment: 21.
- Fall 2003, 26.524: Process Analysis, Instrumentation, and Control, Enrollment: 9.
- Spring 2003, 26.373: Mold Engineering I, Enrollment: 21.
- Spring 2003, 26.521: Lean Plastics Manufacturing, Enrollment: 10.
- Fall 2003, 25.107: Introduction to Engineering I, Enrollment: 288.
- Spring 2004, 26.373: Mold Engineering I, Enrollment: 23.
- Spring 2004, 26.521: Lean Plastics Manufacturing, Enrollment: 12.
- Fall 2004, 25.107: Introduction to Engineering I, Enrollment: 279.
- Spring 2005, 26.373: Mold Engineering I, Enrollment: 14.
- Spring 2005, 26.521: Lean Plastics Manufacturing, Enrollment: 13.
- Fall 2005, 25.107: Introduction to Engineering I, Enrollment: 307.
- Spring 2006, 26.373: Mold Engineering I, Enrollment: 25.
- Spring 2006, 26.524: Process Analysis, Instrumentation, and Control, Enrollment: 12.

**Service:**

- Associate Editor, Advances in Polymer Technology, 2004-2006.
- Chair, ASME Design for Manufacturing Technical Committee, 2003-2005.  
Responsibilities have included staffing conferences for the DFM tracks at annual Design Engineering Technical Conference, International Mechanical Engineering Congress, and National Manufacturing Week. Also responsible for liaison with Design Education and other technical committees as well as tri-annual reports and meetings with the Design Division Executive Committee.
- Associate Editor, ASME Journal of Mechanical Design, 2003-2006.
- Chair, Design for Manufacturing Symposium, International Mechanical Engineering Congress, November, 2004.
- Vice-Chair, ASME Design for Manufacturing Technical Committee, 2001-2003.
- Chair, 6th Design for Manufacturing Symposium, ASME Engineering Design Technical Conferences, 2001.

- Program Chair, 5th Design for Manufacturing Symposium, ASME Engineering Design Technical Conferences, 2000.
- Chair, SPE Processing Instrumentation, Process Monitoring, and Control Special Interest Group, 2005-2008.
- Chair, Molding Technology Symposium, International Polymer Processing Conference, June, 2004.
- Associate Editor, Polymer Plastics Technology and Engineering, 2001-2006.
- Associate Editor, ASME Journal of Mechanical Design, 2001-2006.
- Ad Hoc Reviewer, IEEE Transaction on Engineering Management, 2004-.
- Ad Hoc Reviewer, International Journal of Food Science, 2003-04.
- Liaison, Service Learning Project for the Tsongas Industrial History Center's Innovation Laboratory, 2004-.
- Incorporated service learning project in the Introduction to Engineering course. Project involved liaison with staff at Tsonga, project development, student instructions in both lectures and sections, co-evaluation of projects, post-processing of evaluations, development of exhibit, individual supervision of final student projects, and final exhibition at Tsongas.
- Member, UML Faculty Senate, 2003-.
- Ad Hoc Reviewer, American Institute of Aeronautics and Astronautics, 2003-.
- Ad Hoc Reviewer, Artificial Intelligence for Engineering Design, Analysis and Manufacturing, 2003-.
- Author and Administrator, Plastics Engineering Web Site, 2003. Responsibilities have included renovation and deployment of department web site. Surveyed students, faculty, and alumni to characterize requirements. Developed architecture and functionality. Implemented new site with content from Department Head Robert Malloy and assistance from a computer science graduate student.
- Ad Hoc Reviewer, ASME Journal of Manufacturing Science, 1998-.
- Ad Hoc Reviewer, ASME Journal of Mechanical Design, 1996-.
- Ad Hoc Reviewer, IEEE Transactions on Automation Science and Engineering, 2001-.
- Member, University Patent Evaluation Committee, 2000-2001.
- Ad Hoc Reviewer, International Polymer Processing, 1999-.
- Ad Hoc Reviewer, Journal of Polymer Composites, 2000-.
- Ad Hoc Reviewer, NSF Design Engineering Program, 1996-2000.
- Ad Hoc Reviewer, NSF Manufacturing Equipment Program, 2000-.
- Ad Hoc Reviewer, NSF Manufacturing Processes Program, 2000-.
- Ad Hoc Reviewer, NSF Operations Management Program, 1999-.
- Ad Hoc Reviewer, NSF Small Business Initiative Research Program, 2003-.
- Ad Hoc Reviewer, Polymer Plastics Technology & Engineering, 2000-.

- Ad Hoc Reviewer, Polymer Engineering & Science, 1997-.
- Ad Hoc Reviewer, Research in Engineering Design, 1998-.
- Ad Hoc Reviewer, Rheological Acta, 2003-.
- Member, Collaboration Catalyst Corp. Technical Advisory Board, 2001-.
- Member, Mold-Masters Advisory Council, 2003-2005.
- Founding Member, ThermoCeramix Technical Advisory Board, 2003-2005.

## **Exhibit B**



**Mark Baker**

---

**From:** David Kazmer [dkazmer@comcast.net]  
**Sent:** Friday, July 21, 2006 9:22 AM  
**To:** n.smith@oberthurcs.com  
**Cc:** Edward DeFranco; Mark Baker  
**Subject:** Lamination Trials

Hi Nicha,

As discussed in our telephone conversation this morning, this e-mail describes the different lamination trials that I'd like run.

**Run 1: AMEX, Holes in IR Blocker, Current Process**

Assemble one book containing 10 sandwiches for a current commercial AMEX card, including printing and the holes in the IR blocker. Run on the Burkle #8 at the current standard conditions, which should be:  
Heating press: Temperature @ 315F. Pressure @ 40 for 4 minutes followed by 120 for 18 minutes.  
Cooling press: Cooling @ 55 F. Pressure @ 80 for 2 minutes followed by 210 for 18 minutes.

**Run 2: AMEX, Holes in IR Blocker, Old Process**

Assemble one book containing 10 sandwiches for a current commercial AMEX card, including printing and the holes in the IR blocker. Run on the Burkle #8 at the old process conditions, which were:  
Heating press: Temperature @ 320F. Pressure @ 40 for 4 minutes followed by 128 for 14 minutes.  
Cooling press: Cooling @ 55 F. Pressure @ 80 for 4 minutes followed by 200 for 12 minutes.

**Run 3: AMEX, No Holes in IR Blocker, Current Process**

Assemble one book containing 10 sandwiches for a current commercial AMEX card, including printing but without the holes in the IR blocker. Run on the Burkle #8 at the current standard conditions, which should be:  
Heating press: Temperature @ 315F. Pressure @ 40 for 4 minutes followed by 120 for 18 minutes.  
Cooling press: Cooling @ 55 F. Pressure @ 80 for 2 minutes followed by 210 for 18 minutes.

**Run 4: AMEX, No Holes in IR Blocker, Old Process**

Assemble one book containing 10 sandwiches for a current commercial AMEX card, including printing but without the holes in the IR blocker. Run on the Burkle #8 at the old process conditions, which were:  
Heating press: Temperature @ 315F. Pressure @ 40 for 4 minutes followed by 128 for 14 minutes.  
Cooling press: Cooling @ 55 F. Pressure @ 80 for 4 minutes followed by 200 for 12 minutes.

**Run 5: XENON, Holes in Pre-Lam, Current Process**

Assemble one book containing 10 sandwiches for a current commercial XENON card, including printing and the holes in the pre-lam. Run on the Burkle #8 at the current standard conditions, which should be:  
Heating press: Temperature @ 265F. Pressure @ 40 for 4 minutes followed by 120 for 18 minutes.  
Cooling press: Cooling @ 55 F. Pressure @ 80 for 2 minutes followed by 210 for 18 minutes.

**Run 6: XENON, No Holes in Pre-Lam, Current Process**

Assemble one book containing 10 sandwiches for a current commercial XENON card, including printing but without the holes in the pre-lam. Run on the Burkle #8 at the current standard conditions, which should be:  
Heating press: Temperature @ 265F. Pressure @ 40 for 4 minutes followed by 120 for 18 minutes.  
Cooling press: Cooling @ 55 F. Pressure @ 80 for 2 minutes followed by 210 for 18 minutes.

Please count for each sheet of inlay or pre-lam how many chips were dead prior to lamination at Oberthur. After lamination, assess the quality per ISO and Oberthur standards to check for: dimensions, thickness, flatness, warpage, wireless functionality, print quality, etc.

If you have any questions, please reply to this e-mail or call me at my office (978) 934-2962.

\_\_\_\_\_

12/15/2006

David Kazmer, P.E., Ph.D.  
Dept. Plastics Engineering  
Univ. Mass. Lowell  
1 University Ave.  
Lowell, MA 01854  
(978) 934-2962  
[david\\_kazmer@uml.edu](mailto:david_kazmer@uml.edu)  
<http://kazmer.uml.edu>

12/15/2006

**Mark Baker**

---

**From:** Smith, Nicha [N.Smith@oberthurcs.com]  
**Sent:** Friday, August 11, 2006 10:59 AM  
**To:** Mark Baker  
**Subject:** RE: Testing

Mark,

We have 4 sets of 5 laminated sheets.

3 sheets are being punched into Cards. (3 x 54 = 162 cards) per test  
2 sheets are laminated and whole sheets.

Here are the results.

Run #1 - 5 Sheets x 54 = 270 (2 Lamination Rejects, 0 TI rejects) = 268 Good  
Run #2 - 5 Sheets x 54 = 270 (2 Lamination Rejects, 1 TI reject) = 267 Good  
Run #3 - 5 Sheets x 54 = 270 (230 Lamination Rejects, 1 TI reject) = 39 Good  
Run #4 - 5 Sheets x 54 = 270 (220 Lamination Rejects, 2 TI rejects) = 48 Good

Regarding running with other Amex card orders. We are not processing Amex jobs at this time. The jobs quantities have not been released by Amex for the jobs at this time, therefore, we did not run these cards with three other books. Also, the plates get destroyed when we run the tests without the holes. Barry can explain this better.

The cards are being punched now. Do you want to wait till Monday to mail because of sending overnight delivery?

Regards,

Nicha

-----Original Message-----

**From:** Mark Baker [mailto:markbaker@quinnemanuel.com]  
**Sent:** Friday, August 11, 2006 11:42 AM  
**To:** Smith, Nicha  
**Subject:** RE: Testing

Nicha,

Of the ten sheets that you are going to laminate, please punch out cards from 6 of the 10 sheets (saving 2 sheets from each 5 sheet set of cards with punched, or non-punched, IR blockers).

For the sample of cards that you will laminate using the "current" Amex lamination cycle, if possible please laminate these cards with three other books of commercial Amex cards, and please send me a copy of the job jacket for the commercial cards.

Thanks for your help,  
Mark

---

**From:** Smith, Nicha [mailto:N.Smith@oberthurcs.com]  
**Sent:** Friday, August 11, 2006 9:17 AM  
**To:** Mark Baker  
**Subject:** RE: Testing

12/15/2006

Still awaiting a response from either Aontec or Barry.

Nicha

-----Original Message-----

**From:** Mark Baker [mailto:markbaker@quinnemanuel.com]

**Sent:** Friday, August 11, 2006 9:16 AM

**To:** Smith, Nicha

**Subject:** RE: Testing

Thanks for the update Nicha. Let me get back to you on the punching issue in about an hour, I want to run it by our expert and see what he thinks.

Is Aontech also going to send us an inlay sample?

Thanks, Mark

---

**From:** Smith, Nicha [mailto:N.Smith@oberthurcs.com]

**Sent:** Friday, August 11, 2006 9:14 AM

**To:** Mark Baker

**Subject:** RE: Testing

**Importance:** High

Mark,

Update:

We should be receiving the inlay from Smartrac on Monday. Barry informed them that this is critical and that it needed to ship today.

Secondly,

We are performing the Amex 5 sheets (4 tests) today. Question is - Do you want all the cards punched? or do you want some cards punched and some in sheet form?

We are continuing with the tests, but will not punch the cards until we hear from you.

Regards,

Nicha

-----Original Message-----

**From:** Mark Baker [mailto:markbaker@quinnemanuel.com]

**Sent:** Friday, August 04, 2006 5:13 PM

**To:** Smith, Nicha

**Subject:** Testing

Hi Nicha,

When you have time, please let me know if we have received any of the prelams from Aontech or Smartrac, or whether the Amex materials have arrived.

Thanks,

Mark

12/15/2006

## **Exhibit C**

**Mark Baker**

---

**From:** PHILIPPE CASTANO [philippe.castano@smartrac-group.com]  
**Sent:** Wednesday, November 08, 2006 11:01 PM  
**To:** Mark Baker  
**Cc:** b.mosteller@oberthurcs.com; thomas.decker@smartrac-group.com  
**Subject:** RE: Antenna stress & request for information

Hi Mark,

- 5 sheets with cavity: 97% yield
- 5 sheets without cavity: 26% yield
- Same lamination profile and structure (A971) than on the previous lot.

Regards,  
Philippe

---

**From:** Mark Baker [mailto:markbaker@quinnemanuel.com]  
**Sent:** Thursday, November 09, 2006 9:19 AM  
**To:** wichairat.se@smartracgroup.com  
**Cc:** b.mosteller@oberthurcs.com; philippe.castano@smartrac-group.com; thomas.decker@smartrac-group.com; wandee.se@smartracgroup.com  
**Subject:** Re: Antenna stress & request for information

Thanks!

----- Original Message -----

**From:** Wichairat Serbchaowa-sirikul <wichairat.se@smartracgroup.com>  
**To:** Mark Baker  
**Cc:** Mosteller, Barry <B.Mosteller@oberthurcs.com>; PHILIPPE CASTANO <philippe.castano@smartrac-group.com>; Thomas Decker <thomas.decker@smartrac-group.com>; Wandee Seesang <wandee.se@smartracgroup.com>  
**Sent:** Wed Nov 08 17:32:04 2006  
**Subject:** RE: Antenna stress & request for information

Dear Mark,

Sorry, the shipment we plan for yesterday will be released out today, due to it caused of Customs working process.

The shipping details will keep you posted in shortly.

Best regards,

Wichairat S.

12/15/2006



SMARTRAC Technology Ltd. (Thailand)

Mr. Wichairat Serbchaowa-sirikul  
Sales-Coordinator  
142 Moo, Hi-Tech Industrial Estate, Tambon Ban Laean

Amphor Bang-pa-in

Phra Nakorn Si Ayutthaya 13160

Thailand

Office: + 66 3531 4020

Fax: + 66 3572 9051

Email: [wichairat.se@smartracgroup.com](mailto:wichairat.se@smartracgroup.com) <<mailto:wichairat.se@smartracgroup.com>>

Internet: [www.smartrac-group.com](http://www.smartrac-group.com) <<http://www.smartrac-group.com/>>

---

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---

From: Mark Baker [<mailto:markbaker@quinnemanuel.com>]

Sent: Thursday, November 09, 2006 4:24 AM

To: PHILIPPE CASTANO; Thomas Decker; Wichairat Serbchaowa-sirikul

Cc: Mosteller, Barry

Subject: RE: Antenna stress & request for information

Hi Thomas and Philippe,

Please let me know if the sheets went out today, so I can alert Oberthur.

Thanks,

Mark

---

From: PHILIPPE CASTANO [<mailto:philippe.castano@smartrac-group.com>]

Sent: Monday, November 06, 2006 2:56 AM

To: 'Thomas Decker'; Mark Baker; Wichairat Serbchaowa-sirikul

12/15/2006

Cc: 'Mosteller, Barry'  
Subject: RE: Antenna stress & request for information

Hi Thomas,

We plan to ship the sheets on coming Wednesday.

Regards,

Philippe

---

From: Thomas Decker [<mailto:thomas.decker@smartrac-group.com>]  
Sent: Tuesday, October 31, 2006 9:32 PM  
To: 'Mark Baker'; 'PHILIPPE CASTANO'  
Cc: 'Mosteller, Barry'  
Subject: RE: Antenna stress & request for information

Hi Philippe

Can you please confirm to Mark till when we can ship the last round lamination trail with the consigned micro controller (according to Wichairat modules arrived end of last week at STTH). Mark has a dead line on the 17th November – till than he has to have filed all his papers. To meet this deadline they will need the inlays latest by next week in order to have still time for end-lamination and preparation of documentation.

If possible please also send them a data sheet or at least product code for the PVC and copper wire used.

Regards

Thomas

---

From: Mark Baker [<mailto:markbaker@quinnemanuel.com>]  
Sent: Thursday, October 26, 2006 11:40 PM  
To: Thomas Decker; PHILIPPE CASTANO  
Cc: Mosteller, Barry  
Subject: Antenna stress & request for information

12/15/2006

Dear Philippe and Thomas,

We would like to know how much stress the antenna in the Oberthur prelams can receive. Did the antenna supplier provide you with information about the antenna's allowable stress or yield stress? If so, please send that information to me. Alternatively, please let me know who supplies you with the antenna spool that you embed onto the inlay, and we can contact them directly.

Also, please send me any specification sheets that you might have for the plastic sheets used in the Oberthur prelams: Klockner afterplast / EVC 347-1112 / EVC 227-1112. We need to find out the modulus of the inlay and surrounding materials. We will also contact these manufacturers for this information.

Best regards,

Mark

Mark D. Baker  
Quinn Emanuel Urquhart Oliver & Hedges, LLP  
51 Madison Avenue, 22nd Floor  
New York, NY 10010  
Direct: (212) 849-7136  
Main Phone: (212) 849-7000  
Main Fax: (212) 849-7100  
E-mail: [markbaker@quinnemanuel.com](mailto:markbaker@quinnemanuel.com) <<mailto:umarkbaker@quinnemanuel.com>>  
Web: [www.quinnemanuel.com](http://www.quinnemanuel.com) <<http://www.quinnemanuel.com/>>

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12/15/2006

**Mark Baker**

---

**From:** Mosteller, Barry [B.Mosteller@oberthurcs.com]  
**Sent:** Monday, November 13, 2006 12:34 PM  
**To:** Mark Baker  
**Subject:** With holes test  
**Attachments:** Counts for hole vs no hole.xls

Mark,

I corrected the spread sheet numbers... brain fart... <<Counts for hole vs no hole.xls>>

Regards,

**Barry Mosteller | Oberthur Card Systems**

Director of Product Development

Tel: 610.280.2910 | Fax: 610.524.2412

[b.mosteller@oberthurcs.com](mailto:b.mosteller@oberthurcs.com) | [www.oberthurcs.com](http://www.oberthurcs.com)

523 James Hance Court. | Exton, PA 19341 | USA

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**Prelam made without protective holes**

	<b>Smartrac</b>		<b>Extton</b>	
	<b>Good</b>	<b>Bad</b>	<b>Good</b>	<b>Bad</b>
<b>Sheet 1</b>	20	16	20	16
<b>Sheet 2</b>	0	36	0	36
<b>Sheet 3</b>	2	34	4	32
<b>Sheet 4</b>	1	35	0	36
<b>Sheet 5</b>	2	34	2	34

Two prelamms they have as bad, I get as alive and two I have dead, they have as good  
 Agree  
 I have 2 alive they have as bad  
 I have the one they marked as good as dead  
 Agree

**Prelam made with protective holes**

	<b>Smartrac</b>		<b>Extton</b>	
	<b>Good</b>	<b>Bad</b>	<b>Good</b>	<b>Bad</b>
<b>Sheet 1</b>	34	2	36	0
<b>Sheet 2</b>	36	0	36	0
<b>Sheet 3</b>	35	1	36	0
<b>Sheet 4</b>	35	1	35	1
<b>Sheet 5</b>	36	0	36	0

May be performance issue  
 Agree  
 May be performance issue  
 Agree  
 Agree